



**Government of Orissa
Department of Water Resources**

**Guidelines
for
Construction of Check Dams**

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Guidelines for Construction of Check Dams

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Guidelines for Construction of Check Dams.

Introduction :

Orissa depends largely upon monsoon for its Water Resources. South West Monsoon triggers rainfall in the State. About 78% of total annual rainfall occurs during the period from June to September. In addition to seasonal availability the rainfall in the state also shows a spatial variation. Under normal conditions the State receives annual precipitation of about 230.76 billion cubic meter (BCM). Of the total precipitation, a part is lost by evaporation, transpiration and deep percolation and a part stored in the form of ground water reserve, the remaining appears as surface runoff. Considering the topographical and geological limitations, 75% of the average annual flow can be utilized. Till-date a storage capacity of 17 BCM has so far been developed through completed major, medium & minor (flow) projects. The projects under construction will contribute to an additional 1.47 BCM. The per capita water storage needs substantive improvement keeping in view the challenges going to be faced by water sector.

Taking into account the limitation of storage schemes and their long gestation period, State Government is keen to utilize a part of the surplus surface runoff flowing down to the sea through interventions such as Check Dams or Instream Storage structures in small rivers / streams and anicuts in bigger streams / rivers.

Objective :

The broad objectives of Check Dams (In-stream Storage Structures) are :

- To provide drinking water facilities in the villages along both the sides of the river after monsoon period.
- Ground Water recharge
- To provide incidental irrigation during late Khariff and Rabi by storing water at the end of monsoon mainly through lifting devices.

- Irrigation use of water flowing down drainage channels.
- To divert water from perennial / semi-perennial streams in hilly areas for irrigation purpose.
- Other uses by villagers like bathing, washing, fishing, recreation etc. depending on location and potentiality.

Selection Criteria :

The Check Dams will store or divert surplus water flowing to the sea at the end of monsoon. While selecting locations for construction of in-stream storage structure or check dams the following principles & priorities are to be followed.

- Blocks having less than 35% irrigation coverage to be considered.
- Areas where farmers are using traditional irrigation by constructing temporary cross bunds on streams.
- Where the farmers are willing to take up operation & maintenance of the structure.
- The newly constructed structure should not have any adverse impact on the hydrological efficacy of the existing, ongoing and future major, medium, minor (flow) irrigation and minor (lift) irrigation projects.
- In-stream storage will be developed near urban centers if suitable rivers and locations available for multipurpose domestic and irrigation use.

Though the purpose of the scheme is to be demand driven, hydrologically and technically feasible sites may be considered by DoWR and local people are to be consulted prior to taking any action for implementation. The main emphasis on selection of a site will be proper use of water through people's participation.

Sailent Features & Types of Check Dams : _

The check dams or in-stream storage structures with or without gated arrangements are to be capable of safely releasing the anticipated design flood without affecting the safety of the structures with minimum afflux in the upstream. Water can be stored in such a pond / reservoir towards the end of monsoon.

Basing on the type of stream or nallah where the structure is proposed to be constructed the check dams may be divided into three categories. To achieve these

objectives three types of check dams have been selected primarily basing on the type of the stream.

1. Check dams, upto a height of 2.0 mt. can be constructed across small tributaries / nallah / drainage channel within the banks and streams in middle and higher reaches (within approx. 50 mts. wide)
2. Check dams in deltaic rivers/ drainage channel (lower reaches) (within approx 50 mts. wide).
3. Storage across major rivers and streams having higher width and huge flood water discharge.

1. ***Check dams upto a height of 2.0mt. can be constructed across small tributaries / nallah / drainage channel within the banks and in hill streams.***

These storage schemes will be low cost structures and will be primarily used for the purpose of irrigation through lift, re-charging of ground water and providing drinking water facility to nearby villages. People have to develop their own irrigation system (either lift or flow) from the check dams

2. ***Check dams in deltaic rivers/ drainage channel.***

These structures will be constructed on deltaic rivers / nallah / drainage channel with alluvial bed and will be primarily used for providing irrigation facility by lifting water during later part of monsoon and rabi. At places existing, ongoing and future foot bridges may be used for storing water by providing wooden planks / steel shutters between the piers or through putting sand bags considering safety of the structure.

3. ***Storage across major rivers and streams having higher width and huge flood water discharge.***

These structures can be used for the purpose of drinking water facilities to nearby villages, irrigation facility to the nearby areas with minimum lift, useful for meeting industrial demands during lean periods (Nov-May). The sites will be selected after detail survey & investigation. These structures will be constructed, operated and maintained by the department.

Design Aspect :

1. ***Check dams on small streams / nallahs / drainage channel & Deltaic river:***

All the structures shall be designed as per standard practices for ensuring the safety & economy.

The height of these structures will be normally within 2.0 m. The storage arrangement can be made through provision of alternate piers with

two grooves on each side for providing wooden planks/ steel shutters in position and gates of wooden planks/ shutter / sand bags to store water. These structures are to be constructed in series to make them more effective by storing more water for attaining their objectives.

2. Check dams on main streams.

As these are important structures on main streams, the design of these structures shall confirm to prevailing codes & references.

Implementation Arrangements.

The scheme will be implemented through the existing field units of major & medium irrigation sector and minor (flow) irrigation sector following standard extant codal procedures with following stipulations.

The tender should be invited on percentage basis as per OPWD Code Vol. I Clause 3.5.5(v) for these works.

The small check dam works will be taken up by inviting tenders keeping a minimum bid period of 10 days, so as to complete the tendering process and issuance of work order at the earliest, preferably within a month. Maximum one month time should be prescribed for completion of works. As per the latest amendment to para 3.5.5. (Note-II) of OPWD code, additional performance security are to be deposited at the time of execution of agreement by successful bidders when the bid amount is seriously unbalanced. It is observed that in many cases successful bidders are not responding for drawal of agreement causing abnormal delay in finalization of tenders. Since in-stream storage structures are to be completed within a short period the following amendment in the agreement / tender document are to be incorporated.

“Additional performance security shall be deposited by the bidder when the bid amount is seriously unbalanced i.e. less than the estimated cost by more than 10% along with the tender. The bidder will deposit the additional performance security to the extent of the differential cost of the bid amount and 90% of the estimated cost in shape of Post Office Saving Bank Account / National Savings Certificate / Post Office Time Deposit Account / Kissan Vikash Patra / Deposit receipt of Schedule Banks”.

Failure to comply the above clauses will lead to make the bid invalid for such bidders.

On completion, the Projects will be handed over to Pani Panchayats/farmer groups for proper management. Consent of farmers before / during and after completion of work will be obtained and kept in the case record. Executive Engineers will be personally responsible for timely completion of the work with quality and subsequent use for various purpose.

Separate implementation arrangements will be made and guidelines will be prepared for barrages / anicuts across major streams and big rivers which will be constructed, operated and maintained by the department.

Operation and Maintenance:

On completion, the small check dam projects will be handed over to Pani Panchayats / farmer groups for proper management.

1. Pani Panchayats (WUAs) should be formed by the beneficiaries of the scheme during the process of selection of site for check dams. These Pani Panchayats are to actively participate during the execution of the scheme.
2. The infrastructure once completed in all respects will immediately be handed over to Pani Panchayats (W.U.As) for its operation and maintenance. However, technical guidelines and assistance required for operation and maintenance will be extended to the Pani Panchayats (WUAs) free of cost by the department.

The Department responsible for execution of the scheme will supply the wooden / steel planks or sand bags once only and demonstrate the operation of putting shutters / planks / sand bags in position and their removal, transportation and maintenance in real field scenario. However the Pani Panchayats (W.U.As) are required to meet / provide the cost of shutters, any other materials etc. including cost of labour and other incidental charges during operation and maintenance in subsequent years after handover.

3. It is mandatory that the waterway of check dams constructed across stream / nallah / drainage channel etc. should be free from any obstructions / interventions made by planks / steel shutters / sand bags etc. before onset of the monsoon or later by 5th of June every year. However, the department may ask / expect to be in readiness to lift / remove the shutters etc. to make the water way clear of any obstruction during any time of their operation and maintenance period to meet

exigencies like managing non-monsoon flashy flood or meeting downstream water requirement.

4. The Pani Panchayats (W.U.As) are responsible to install lifting arrangement for lifting water from the pond and its conveyance for equitable irrigation to users' farms.
5. The Pani Panchayats (W.U.As) may install and maintain pipe conduits, taps etc. and take care to make water hygienic, if the water is to be used for drinking purpose.

Fund flow Arrangement :

Funding for execution of check dams in KBK districts are to be met from Special Component Assistance (SCA) and Additional Central Assistance (ACA). Similarly, State's own fund is to be utilized for execution of check dams in Non-KBK districts. The funds will be placed in the annual outlay of the Department. Various Industries using water will be asked to participate in anicut / barrage projects in upstream areas by contributing funds to government for execution of such projects to conserve water for use in non monsoon period.

Institutional Arrangement :

The scheme will be implemented through the existing field units of major & medium irrigation sector and minor (flow) irrigation sector. The concerned Chief Engineers / Chief Engineers & Basin Managers / Chief Construction Engineers will prepare a list of viable projects out of the probable projects furnished by the field Executive Engineers after due consultative process with the local people. The final list of the projects will be prepared by the Engineer-in-Chief, Planning and Designs in consultation with the Chief Engineer, PP&F and Chief Engineer, Designs, Research and Quality Control. This list will be placed to DoWR for concurrence and then steps will be taken for implementation of the project.

While preparing the probable list of projects the selection criteria as indicated above are to be followed.

The field unit will take steps to document the pre and post project scenario of the project site.

Monitoring Mechanism :

State level monitoring committee:-

The progress of selection of sites for in-stream storage structures and implementation will be monitored by a State level monitoring committee with the following structure.

Chief Secretary	-	Chairman
Agricultural Production Commissioner	-	Member
Secretary, Finance Department	-	Member
Secretary, Revenue & Disaster Management Department	-	Member
Secretary, Agriculture Department	-	Member
Secretary, Energy Department	-	Member
Secretary, Department of Water Resources	-	Member Convenor
Engineer-in-Chief, Water Resources, Orissa, Bhubaneswar	-	Member
Engineer-in-Chief, Planning & Designs, Bhubaneswar	-	Member
Chief Engineer, Minor Irrigation, Bhubaneswar	-	Member
Any other Govt. Officer with the permission of the Chair-		Member

The State level monitoring committee meeting will be held twice within a financial year.

District level monitoring committee:-

The progress at district level will be monitored by one district level monitoring committee under the chairmanship of the Collector & District Magistrate of the district. The Executive Engineer, Minor Irrigation of the district will be the member convenor with concerned Superintending Engineers and other concerned Executive Engineers and District Agricultural Officers as members. These monitoring committees will be notified by the Department of Water Resources. The district level monitoring committee meeting will be held once in every quarter of each financial year.

Department level monitoring:-

The progress of the activities under the scheme will be monitored by the Director, M&E, office of the Engineer-in-Chief, WR. Each Chief Engineer / Chief Engineer & Basin Manager will prepare and furnish a monthly progress report during the 1st week of each month preferably transmitted electronically. The Director M&E

will prepare a consolidated progress report and furnish it to DoWR under intimation to all the Chief Engineers and Basin Managers / Chief Engineers and Engineer-in-Chiefs. Day to day progress will be monitored by the regular monitoring arrangements of the department.

Way Forward :

After success of the 1st phase construction of check dams and as per the demand from farmers / industries, the State Government may suitably modify / amend / alter any guidelines / norms in the scheme if any difficulties / problems arise during implementation of the scheme for achieving better performance under the scheme.

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